

Serial No. 10/043,140
July 13, 2004
Reply to the Office Action dated April 13, 2004
Page 9 of 12

REMARKS/ARGUMENTS

Claims 1-20 are pending in this application. By this Amendment, Applicant amends claims 1-4, 7-9, 11, 12 and 18.

Applicant greatly appreciates the Examiner's indication that claim 20 would be allowable if rewritten in independent form including all of the features of the base claim and any intervening claims.

Claims 1-19 were rejected under 35 U.S.C. § 102(b) as being anticipated by Ushiroku et al. (U.S. 6,137,380). Claims 1-19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ushiroku et al. in view of Satoh et al. (U.S. 5,631,612). Applicant respectfully traverses these rejections.

Claim 1 has been amended recite:

"A ladder circuit type surface acoustic wave filter device comprising:
a piezoelectric substrate;

a plurality of parallel arm resonators and a plurality of series arm resonators provided on said piezoelectric substrate, the parallel arm resonators and the series arm resonators being defined by surface acoustic wave resonators; and

a plurality of inductors respectively connected in series to said plurality of parallel arm resonators; wherein

the parallel arm resonators include at least one first parallel arm resonator of said plurality of parallel arm resonators connected to one of an input end and an output end of the filter device, and a second parallel arm resonator of said plurality of parallel arm resonators connected to a junction between two series arm resonators of said plurality of series arm resonators; and

said at least one first parallel arm resonator and said second parallel arm resonator have a relationship represented by the following expression:

$$Cp1 \times 2 < Cp2$$

where Cp1 represents the capacitance of said at least one first parallel arm resonator, and Cp2 represents the capacitance of said second parallel arm resonator; and

a total equivalent inductance of all of the inductors of said plurality of inductors that are connected to said second parallel arm resonator is less than a total equivalent inductance of all of the inductors of said plurality of inductors connected to each of said at least one first parallel arm resonator." (emphasis added)

Serial No. 10/043,140

July 13, 2004

Reply to the Office Action dated April 13, 2004

Page 10 of 12

With the unique combination and arrangement of elements recited in the present claimed invention, including "a total equivalent inductance of all of the inductors of said plurality of inductors that are connected to said second parallel arm resonator is less than a total equivalent inductance of all of the inductors of said plurality of inductors connected to each of said at least one first parallel arm resonator," Applicant has produced an improved ladder circuit type SAW filter device which has sufficient attenuation in each stop band of ranges higher and lower than a pass band and superior steepness of filter characteristics in a low frequency domain in the vicinity of the pass band (see, for example, the second full paragraph on page 4 of the present application, as originally filed).

The Examiner alleged that Ushiroku et al. teaches all of the features recited in Applicant's claim 1, including "the total equivalent inductance L_c (col. 20, lines 13-15), which is connected to the second parallel arm resonator 25, is substantially equal to a total equivalent inductance L_c of all of the inductors L_1 , L_2 and L_3 connected to the first parallel arm resonator (e.g. 23 or 27) [col. 20, lines 13-15]."

Claim 1 has been amended to recite the feature of "a total equivalent inductance of all of the inductors of said plurality of inductors that are connected to said second parallel arm resonator is less than a total equivalent inductance of all of the inductors of said plurality of inductors connected to each of said at least one first parallel arm resonator" (emphasis added). As acknowledged by the Examiner, Ushiroku et al. only teaches that the total equivalent inductance of the second parallel arm resonator is substantially equal to a total equivalent inductance connected to the first parallel arm resonator, **NOT** that the total equivalent inductance of the second parallel arm resonator is less than a total equivalent inductance connected to the first parallel arm resonator. Thus, Ushiroku et al. clearly fails to teach or suggest the feature of "a total equivalent inductance of all of the inductors of said plurality of inductors that are connected to said second parallel arm resonator is less than a total equivalent inductance of all of the inductors of said plurality of inductors connected to each of said at least one first parallel

Serial No. 10/043,140
July 13, 2004
Reply to the Office Action dated April 13, 2004
Page 11 of 12

arm resonator" as recited in Applicant's claim 1.

Accordingly, Applicant respectfully requests reconsideration and withdrawal of claim 1-19 under 35 U.S.C. § 102(b) as being anticipated by Ushiroku et al.

The Examiner further alleged that Satoh et al. teaches "that it is known to provide a parallel resonator R3 (Fig. 25) connected between two series resonators with a total equivalent inductance of 5.5nH that is less than a total equivalent inductance 7nH of a parallel resonator R5 connected to the input or output of the ladder filter." Thus, the Examiner concluded that it would have been obvious "to have modified the SAW ladder of Ushiroku et al. such that the total equivalent inductance of all of the inductors connected to the middle parallel resonator would have been less than the total equivalent inductance of all of the inductors connected to the input or output resonator [as taught by Satoh et al.]."

As noted above, claim 1 has been amended to recite the feature of "a total equivalent inductance of all of the inductors of said plurality of inductors that are connected to said second parallel arm resonator is less than a total equivalent inductance of all of the inductors of said plurality of inductors connected to each of said at least one first parallel arm resonator" (emphasis added).

As clearly seen in Fig. 25 of Satoh et al., although inductor L2 connected to second parallel arm resonator R3 has a total equivalent inductance, $L_{p2}=5.5\text{nH}$, that is less than the total equivalent inductance, $L_{p3}=7\text{nH}$, of inductor L3 connected to one of the first parallel arm resonators R5, the total equivalent inductance, $L_{p2}=5.5\text{nH}$, of the inductor L2 connected to the second parallel arm resonator R3 is greater than the total equivalent inductance, $L_{p1}=4\text{nH}$, of inductor L1 connected to another first parallel arm resonator R1. Thus, Satoh et al. clearly fails to teach or suggest the feature of "a total equivalent inductance of all of the inductors of said plurality of inductors that are connected to said second parallel arm resonator is less than a total equivalent inductance of all of the inductors of said plurality of inductors connected to each of said at least one first parallel arm resonator" (emphasis added) as recited in Applicant's claim 1.

Serial No. 10/043,140

July 13, 2004

Reply to the Office Action dated April 13, 2004

Page 12 of 12

Accordingly, Applicant respectfully submits that Ushiroku et al. and Satoh et al., applied alone or in combination, fail to teach or suggest the unique combination and arrangement of elements recited in claim 1 of the present application.

Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 1-19 under 35 U.S.C. § 103(a) over Ushiroku et al. in view of Satoh et al.

In view of the foregoing amendments and remarks, Applicant respectfully submits that Claim 1 is allowable. Claims 2-20 depend upon Claim 1, and are therefore allowable for at least the reasons that Claim 1 is allowable.

In view of the foregoing amendments and remarks, Applicant respectfully submits that this application is in condition for allowance. Favorable consideration and prompt allowance are solicited.

The Commissioner is authorized to charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1353.

Respectfully submitted,

Date: July 13, 2004


Attorneys for Applicant

Joseph R. Keating
Registration No. 37,368

Christopher A. Bennett
Registration No. 46,710

KEATING & BENNETT LLP
10400 Eaton Place, Suite 312
Fairfax, VA 22030
Telephone: (703) 385-5200
Facsimile: (703) 385-5080